SYNOPSIS
Outline of the proposed work

Theoretical Physics is in the happy situation of being able to pluck good ideas from philosophy, work them through using the machinery of algebra & produce something which is both stimulating & precise. It goes beyond words & equations because when properly done it encapsulates what many people regard as reality.

General theory of relativity was set up to relate relativity and gravitation. In order to explain it 4D field equations and its solutions are studied but failure of these equations to explain universe led to look for higher dimension. Since mystery of universe is still not solved, hence the Problem based on higher dimension field equations can be taken up. Study of the proposed problem may enlighten the nature of Universe to some extent. By studying solutions of 5D field equations an interesting conclusion can be made about Dark energy.

Kaluza –Klein equation with Wesson theory are required for the study of 5D field equations. As Kaluza-Klein Theory was first theory to introduce Higher dimensions, so this theory and recent developments in it will be studied thoroughly.

In this regard five dimensional field theory is particularly useful as it is the basic extension of the four dimensional space-time of Einstein gravity & is widely regarded as low energy limit of higher dimensional theories which more fully address the particle interactions. The slim volume is concise account of recent development in 5 D theory & their implications for classical & quantum physics.

Kaluza Klein is essentially an extension of Einstein general relativity in 5 dimension which is of much Interest in particle physics and cosmology.

However initial approach does not work well. In the last few decades studies of higher dimension theories has been reviewed & considerably after minimizing many interesting theories of particle interaction need more than 4 dimension for their consistent formulation.

Cosmology is that branch of science which deals with matter and its motion at large. Einstein and De-Sitter model of Universe have been compared with actual Universe. But it is found that these models could not completely explain actual Universe. Cosmological constant is introduced in the field equations to account cosmology which is just considered as constant in Einstein equations . Still the researches are going on to find cosmological constant parameter for the explanation of actual universe. The aim of cosmology is study large scale structure of universe through cosmological models of universe, through cosmological constant.

The general relativity was formulating in space time with just space time dimension. Thus it is important to generalize the results obtained in 4 dimension general relativity in the form of higher dimension and look for its effects due to incorporation extra dimension theory.

There are so many literature & papers which investigate the role of extra dimension; Kaluza Klein (1921), Witten (1924), Emel - Yanov et. al (1986), Liddle (1990), Sokolowski (1989), Chatterjee et al (1990), Banerjee et al (1990), Myer perry (1986), Dianyan (1988), Davidson (1985), Yashimura (1986), Chodos & Detweiler (1980), Shen (1988) .

In this study Problem to be Investigated -

With the above motivation we are going to discuss a class of uniform & isotropic spatially, flat, decaying lambda cosmology in the realm of model where gravitational constant G in the function of cosmological time.

We are also going to investigating some properties of cosmological model with matter creation in the framework of higher dimension. FRW model. We are also going to obtain Homogeneous cosmological model in Kaluza klein theory of gravitation by assuming time dependent equation of state.

We will derive Kaluza Klein type FRW model and find the unique solution for 5D spherically symmetric line element. Some astrophysical parameters are also calculated and comparison made with the analogous 4D space.

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